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# INITIAL TRAINING OF CRANES FOR AN AIRSHIP MIGRATION

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***Abstract:*** We describe the first year of our efforts to train cranes to accept the unnatural stimuli associated with being transported south in cages suspended beneath an airship. All 4 experimental cranes readily acclimated to entering a suspended cage and were trained to accept being jostled while in the cage, even when the cage was transported in the back of a pickup truck. With minor changes, the training protocol is ready for use in an actual airship migration.

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**Key words:** airship, crane, migration, reintroduction

An overview of crane migration and reintroduction techniques is being published in a companion paper (Ellis et al. 2005). The need for additional migration techniques derives from the observation that about 20% of cranes involved in active motorized migrations (i.e., migrations wherein the cranes flew the route behind a motorized air or terrestrial vehicle) either drop out or become so uncooperative as to disallow their continued participation in free flight (Ellis et al. 2003). We reason that, if all or nearly all birds in a passive migration gain enough experience along the airship route to return north unassisted come spring, this new technique could be used to supplement flocks originally established by ultralight aircraft. If the airship proves highly successful as a training device, some future populations could be established from the start by airship migrations. We must mention here that 2 previous attempts with passive migrations (i.e., the stage-by-stage migrations wherein cranes were transported south in a horse trailer and released at ca 30 km intervals to fly and hopefully learn the route; Ellis et al. 2001) produced only marginal results. Our attempt here is to use an airship to provide the birds with much more experience along the route than could be achieved by the stage-by-stage method.

To develop this second form of passive migration, we conducted an experiment in 2002 to see if juvenile sandhill cranes (*Grus canadensis*) could be trained to ride in flight cages which, if preliminary tests were encouraging, would, in future years, be suspended from the belly of an airship. We plan ultimately for 20 or more such cranes to be transported south on a single flight. Airships can travel in a wider variety of weather conditions than ultralight aircraft, they can also stay aloft for longer periods, and can move at speeds up to 80 km/hr. Because of these advantages, we expect that a 3,000 km trip could be completed by airship in approximately 1 week, whereas 5 comparably long ultralight migrations took 40-64 days (J. W. Duff, Operation Migration, personal communication).

Other likely advantages of an airship over the ultralight are (1) that juvenile cranes will need minimal training before the migration, (2) that nearly all training can be done at the propagation center rather than at a remote field station, (3) that holding facilities at the northern terminus can be smaller and simpler, and would be used for a much shorter time, than for trucking or ultralight migrations, and (4) that losses due to collisions with aircraft, attacks by predators, and wandering will be minimal because the birds are caged when aloft and penned between "flights" of the migration. However, even the cranes traveling with the airship must be allowed to fly free for at least a few days at the northern terminus and thus be encouraged to imprint on and return to this "natal" area. The use of portable pens would have the advantage of allowing the next year's reintroduction to take place at a different natal area, and because no large and permanently constructed pens would be required, there would be no build-up of fecal material and associated pathogens common to pens used year after year.

## METHODS

Although in 2002 we at Patuxent Wildlife Research Center began preparations for an airship migration, we hasten to mention that no airship was available so no migration was attempted. Rather chicks were reared to determine if they would tolerate the visual, auditory, and tactile stimuli somewhat like that associated with an airship migration. We hatched 4 greater sandhill crane (*G. canadensis tabida*) chicks for training. All were reared much as for costume-reared Mississippi sandhill cranes (*G. c. pulla*) (Ellis et al. 1992) except we used costumes only to avoid breaking protocol while in the vicinity of costume-reared birds for other projects.

Details of the unique rearing and training experiences related to the airship pilot work are presented in Fig. 1. In general, colts were subject to situations they would experience in an actual airship migration. Cage training proceeded 1 bird at a time. The "flight cage" was 1.2 x 2.4 x 1.5 m with 1.3 cm diameter metal pipe bars spaced at 13 cm (center to center) intervals. This cage was large enough to allow a single bird to flap as if in flight. The roof of the cage was covered with nylon netting. The floor was of 2.5 x 2.5 cm mesh, vinyl-coated, welded wire.

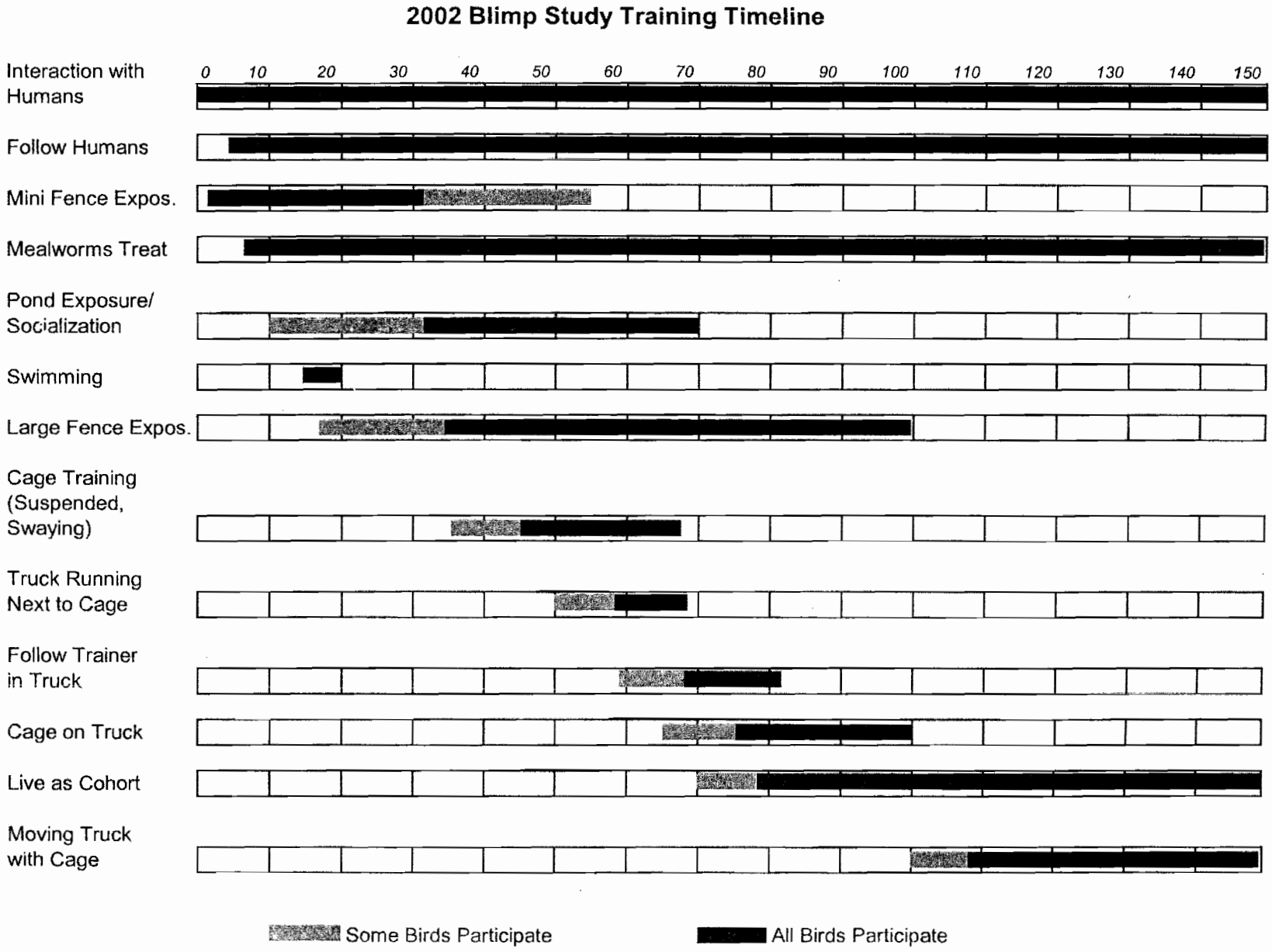


**Fig. 1. Timeline for training sandhill crane chicks to accept stimuli like that of an airship migration. Ages (top row) are in days.**

## RESULTS

Figure 1 presents the timing of major features of our training program. Un-costumed humans interacted with the chicks from hatching, and by age 5 days, chicks were following humans. Mini fences (50.8 cm tall with 1.3 cm diameter pvc plastic bars spaced 2.5 cm apart and consisting of 2 walls each 45.7 cm long and meeting at right angles) were in each pen beginning on Day 1 and for most days until Day 55. (However, we recommend removal of these short fences by Day 25 or as soon as the chicks learn they can see over them.) These, and the tall fences described later, were supplied to teach the birds that they cannot go through and must go around such structures, thus helping them remain calm when confined in the mobile cages. Live mealworms were provided as "treats" to reward progress in training and to lure chicks into pens, up ramps, etc.

Very often, 2 or more birds were led about 200 m to a pond near the cage training area. This practice gave them opportunities to socialize before they were finally placed in a group pen at about Day 70. This practice may have made training more efficient in 2 ways. It was surely more efficient than walking the birds 1 at a time to the training area. Also, the chick being trained to alarming stimuli could view 1 or more chicks a few meters away calmly foraging in or about the pond. This practice had the intended effect of calming the chick then being trained.

Exposure to a tall fence (1.2 m tall with metal bars on 10 cm centers and 2 walls at 90° angles running 1.2 m and 0.8 m away from a common corner) began around Day 18. The fence was constructed of metal electrical conduit just like the large cage the cranes would soon be trained to enter.

The cage was constructed so similar to the tall fence in the pen that the birds seemed comfortable entering the cage from the beginning. Because of this immediate acceptance of the stationary cage, we immediately (Days 35-45) elevated the cage on elastic "bungee" cords and commenced lightly bobbing and swaying the cage as the chick fed on mealworms. Agitation of the elevated cage increased in intensity to simulate movements associated with traveling with a blimp or a truck. All 4 birds remained calm with moderate jostling.

Before Day 60, cage training sessions were held next to a pickup truck with the engine running (Fig. 1). Later the cage was placed across the truck bed. Cranes showed some reluctance to climb the ramp (1.3 cm thick plywood 56 cm wide, 3.7 m long, and covered with a thin, black, ribbed, rubber mat) into the cage. Mealworms were tossed on the ramp to encourage the cranes up. Greater reluctance (grading from merely looking about fearfully to jostling against the bars of the cage) was shown when the truck began to move, but after 1 or 2 sessions, 1 bird appeared comfortable in the cage on the truck even when moving at 40 km/hr. The other 3 continued to show hesitancy while the truck was moving. We believe that had we exposed these 3 to the moving vehicle at an earlier age, they would also have become comfortable with the moving truck. From their experience with the elevated and moveable cage, all 4 learned that treats came from patiently enduring what would otherwise have been alarming stimuli.

## DISCUSSION

In developing the new airship migration protocol, we found that cranes could be made to accept alarming stimuli such as being suspended in a moving cage. However, we can only guess how they will respond to being suspended and moving hundreds of meters aloft. Our training program (Fig. 1) proceeded sequentially with a slowing of progress when responses from the birds indicated reticence to accept the next step. However, all birds completed the program. In our regimen, the only significant impasse was the step involving forward motion of the truck. We believe that the much smoother movement of the airship will cause no problem just as our birds had no problem with the movement of the cage suspended by elastic cords. Eventually we were able to have our birds accept the much rougher jostling of the cage on the bed of a truck driven slowly on a rough gravel road. However, 3 of the 4 were not relaxed when traveling at higher speeds (ca 40 km/hr). When a bird became alarmed and began to press against the bars of its cage, we slowed the truck temporarily.

From the pilot year, we anticipate that it is feasible to train most or all cranes to ride suspended from an airship. Our plan is, at present, to confine each bird to a 2.5-m-wide individual pen, part of an array of pens involving 20-50 cages. The next step is to conduct an actual migration with 10-15 sandhill cranes, then determine if these birds can retrace their migration route or at least find their way back to the northern terminus. Because an airship will provide the birds with a far greater opportunity to see and memorize the landscape than cranes in the 2 stage-by-stage migrations for which we had marginal success in birds returning north, we expect greater return rates with airship birds. Because airship birds cannot stray from our chosen route, collide with propellers, or be attacked by eagles, we expect that losses during migration will be minimal. Of course, for an actual airship migration, a costume-rearing protocol will be imposed. Because airship cranes may have the advantage of joining survivors of previous ultralight migrations, they should also survive well after release. However, all these expectations must await testing.

Each endangered species reintroduction project presents unique problems, which in turn require unique solutions. The best plan may be a combination of ultralight-led or truck-led early migrations to establish a small group of survivors, followed by later migrations with an airship to rapidly build the flock.

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